

**BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2019-182-E

In the Matter of:)
)
South Carolina Energy Freedom Act)
(H.3659) Proceeding Initiated Pursuant)
to S.C. Code Ann. Section 58-40-20(C):)
Generic Docket to (1) Investigate and)
Determine the Costs and Benefits of the)
Current Net Energy Metering Program and)
(2) Establish a Methodology for Calculating)
the Value of the Energy Produced by)
Customer-Generators)

**DIRECT TESTIMONY OF
GEORGE V. BROWN FOR DUKE
ENERGY CAROLINAS, LLC AND
DUKE ENERGY PROGRESS, LLC**

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is George V. Brown, and my business address is 400 South Tryon Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the General Manager of Strategy, Policy, and Strategic Investment for Distributed Energy Technology in the Enterprise Strategy and Planning group at Duke Energy Corporation ("Duke Energy").

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Arts in Economics at Harvard College and a Masters in Business Administration at New York University. I have been employed by Duke Energy since 1998 in a variety of Finance and Strategy roles. In my current role, I am responsible for the development and execution of business strategy and policy support related to distributed energy technology and renewable energy for Duke Energy's retail franchised utilities, including Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" and, together with DEC, the "Companies"). This includes evaluation of legislation and regulation, such as S.C. Act No. 62 of 2019 ("Act 62"), and implementation of customer programs such as those associated S.C. Act No. 236 of 2014 ("Act 236").

1 **Q. HAVE YOU TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION**
2 **OF SOUTH CAROLINA (THE “COMMISSION”) IN ANY PRIOR**
3 **PROCEEDINGS?**

4 A. Yes, I have testified before the Commission on several occasions in the Companies’
5 fuel cases—most recently in Docket No. 2018-1-E—and in the Companies’
6 avoided costs cases in Dockets No. 2019-185-E and 2019-186-E.

7 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

8 A. The purpose of my direct testimony is to provide an overview of the Companies’
9 existing net energy metering programs (“NEM”) under Act 236 (“Existing NEM
10 Programs”), which will include a high-level overview of how the Companies
11 implemented NEM in accordance with Act 236, and the current methodology as
12 determined by Commission Order No. 2015-194 used to determine the value of
13 energy produced by NEM customers. I will also provide forecasts of solar adoption
14 in the Companies’ South Carolina service territories under different NEM rate
15 design options. Additionally, I will introduce the other witnesses providing direct
16 testimony on behalf of the Companies in this docket.

17 **Q. ARE YOU INCLUDING ANY EXHIBITS IN SUPPORT OF YOUR**
18 **TESTIMONY?**

19 A. Yes. I am including (i) a chart highlighting the growth history of NEM in the
20 Companies’ South Carolina service territory as **Brown Direct Exhibit 1** and (ii) a
21 detailed explanation of the methodology used to calculate the value of solar under
22 Existing NEM Programs as **Brown Direct Exhibit 2**.

1 **Q. PLEASE INTRODUCE THE OTHER WITNESSES FILING TESTIMONY**
2 **ON BEHALF OF THE COMPANIES IN THIS DOCKET.**

3 A. In addition to my testimony, the Companies will present direct testimony in this
4 docket from Witness Huber, Witness Harris, Witness Wright, and Witness Ford.

5 Witness Huber

6 Witness Huber will provide the Commission with an overview of NEM customer
7 profiles under Existing NEM Programs and related issues, such as unwarranted
8 cost-shifts and subsidies. Given that Act 62 expressly requires the next generation
9 of NEM to eliminate these inequities “to the greatest extent practicable,” Witness
10 Huber will provide the Commission with an overview of NEM best-practices from
11 other states that have alleviated these inequities, and may be proper for
12 implementation in South Carolina.

13 Witness Harris

14 Witness Harris will provide the Commission with a detailed look at two analyses
15 performed under the overall cost-benefit analysis of the Existing NEM Programs
16 required by S.C. Code Ann. § 58-40-20(D). Specifically, Witness Harris will
17 present testimony detailing the (i) cost of service implications arising from Existing
18 NEM Programs and (ii) the aggregate impact of NEM customers on certain of the
19 Companies’ long-run costs, in each case, under Existing NEM Programs.

20 Witness Wright

21 Witness Wright was engaged by the Companies as a third-party consultant and has
22 a wealth of experience dealing with regulated utilities—including a specific focus
23 on the related economic issues. Witness Wright will provide testimony focused

1 upon the Commission's analysis of the "direct and indirect economic impact" of
2 NEM in South Carolina, as required under the cost-benefit analysis in Act 62.
3 Although Witness Wright did not actually perform such an analysis, Witness
4 Wright draws upon his expertise—as well as best-practices from other
5 jurisdictions—to provide the Commission with a framework under which such an
6 analysis may be properly conducted.

7 Witness Ford

8 Witness Ford was employed by the Office of Regulatory Staff ("ORS") at the time
9 the Commission approved the Existing NEM Programs under Act 236 and provided
10 settlement testimony to the Commission related thereto. After leaving the ORS in
11 2016 and working for two different employers, Witness Ford was engaged by the
12 Companies to support implementation of Act 62's new NEM requirements given
13 her knowledge base, and will provide the Commission with testimony related to the
14 Companies' stakeholder engagement on NEM matters as the Companies and parties
15 have tried to work together in a collaborative manner.

16 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

17 A. In my testimony, I will provide a high-level overview of the Companies' successful
18 implementation of Existing NEM Programs. I will also outline the cost-benefit
19 analysis required by Act 62, as well as the approach taken by the Companies in
20 response to that analysis. I will briefly discuss the results of such analysis, and
21 describe how those results can be leveraged—in conjunction with certain best-
22 practices—to ensure that the next generation of NEM can improve upon the success
23 experienced by the Companies under the Existing NEM Programs while fulfilling

1 the goals of Act 62. My testimony also provides the Commission with a detailed
2 breakdown of the Act 236 methodology pursuant to which energy supplied by
3 customer-generators is valued, and explains why the Companies believe the
4 methodology is appropriate to carry forward, without change for the NEM
5 customers whose rates are governed by Act 236. Finally, I will provide the
6 Commission with a glimpse into the future of NEM in South Carolina by explaining
7 the Companies' forecast for NEM over the next 10 years in their South Carolina
8 service territories.

9 II. EXISTING NEM PROGRAMS

10 **Q. PLEASE PROVIDE A BRIEF OVERVIEW OF HOW THE COMPANIES**
11 **IMPLEMENTED NEM UNDER ACT 236.**

12 A. Act 236 was designed to "jump start" the adoption of distributed solar energy in
13 South Carolina. As such, the Companies created NEM programs that would reduce
14 the upfront cost of customer-owned or leased solar facilities up to 20 kw in capacity
15 for residential customers and up to 1 MW for all other customers. This was
16 accomplished by offering a rebate payable to eligible customers who were part of
17 the first 53 MW of installed solar capacity under Existing NEM Programs.
18 Although the rebate incentive ended at 53 MW, a full retail rate NEM rider was
19 also offered to customers comprising the first 106 MW of installed solar capacity
20 for the Companies, with that limit set at 80 MW in DEC and 26 MW in DEP. These
21 rider limits aligned with the NEM aggregate capacity minimums that all investor

1 owned utilities were required to offer for NEM under Act 236 and was available
2 until each utility hit the capacity minimum or 12/31/2020, whichever came first¹.

3 **Q. HOW SUCCESSFUL WERE THE EXISTING NEM PROGRAMS IN**
4 **SUPPORTING THE CUSTOMER ADOPTION OF SOLAR?**

5 A. As noted in **Brown Direct Exhibit 1**, the Existing NEM Programs were quite
6 successful in supporting the adoption of solar. In fact, the total solar installed
7 capacity for facilities smaller than 1 MW that received support from the Existing
8 NEM Programs in the Companies' South Carolina service territories is 85.5 MW
9 for DEC and 18.8 MW for DEP as of 8/31/2020. These totals do not account for
10 the additional capacity of 10.2 MW for DEC and 2.2 MW for DEP in each
11 company's interconnection queue. These numbers exceed the Companies'
12 minimum goals for NEM small (< 1 MW) solar facilities of 40 MW for DEC and
13 13 MW for DEP by 12/31/2020, as spelled out in the Existing NEM Program Act
14 236 targets.

15 **Q. WHAT FACTORS DOES ACT 62 REQUIRE THE COMMISSION TO**
16 **CONSIDER WHEN EVALUATING THE COSTS AND BENEFITS OF**
17 **EXISTING NEM PROGRAMS?**

18 A. S.C. Code Ann. § 58-40-20(C)(1) requires that the Commission investigate and
19 determine the costs and benefits of the Existing NEM Programs. The Companies
20 conducted a cost-benefit study, utilizing a combination of existing and new
21 measures, and are presenting their findings to assist the Commission's analysis.

¹ Act 236's minimum capacity obligations were removed in Act 62.

1 More specifically, S.C. Code Ann. § 58-40-20(D) directs the Commission to
2 consider the following:

- 3 • Impact of NEM customers on the utility's long-run marginal costs of
4 generation, distribution, and transmission;
- 5 • Cost of service implications on non-NEM customers within the same
6 class as NEM customers;
- 7 • The methodology used to value energy supplied by customer-generators
8 under Existing NEM Programs ("Act 236 VOS");
- 9 • Direct and indirect economic impacts of NEM; and
- 10 • Other information the Commission deems relevant.

11 Additionally, the Commission Directive issued in this docket on August 26, 2020,
12 requires the Companies to present (i) NEM best-practices from other jurisdictions
13 and (ii) a forecast of solar distributed generation in the Companies' South Carolina
14 service territory for the next 10 years as part of this analysis. Although Witness
15 Harris, Witness Huber, and Witness Wright address most of these components in
16 greater detail, I will provide an overview of their testimony and provide a
17 description of the Act 236 VOS and the 10-year forecast of solar distributed
18 generation under different NEM rate frameworks.
19

1 **III. COST-BENEFIT ANALYSIS**

2 **Q. PLEASE DESCRIBE THE COMPANIES' APPROACH IN ANALYZING**
3 **THE LONG-RUN MARGINAL COSTS IN THEIR COST-BENEFIT**
4 **ANALYSIS.**

5 A. Witness Harris's testimony describes how the Companies reviewed the aggregate
6 impact of customer-generators on the utilities' long-run marginal costs of
7 generation, distribution, and transmission. This analysis necessarily required the
8 Companies to conduct a forward-looking analysis to quantify the costs they expect
9 to incur as a result of NEM customers. Through this analysis, the Companies found
10 two key results:

11 1. Customer-generator's exported excess energy has a similar effect and
12 value on the Companies' costs as qualifying facilities connected to the
13 secondary distribution system under the Public Utility Regulatory Policy
14 Act of 1978, 16 U.S.C. §§ 2601, et seq. ("PURPA").

15 2. The impact on the Companies' operations and costs from the customer's
16 consumption of behind the meter solar generation is the same as if the
17 customer reduced its consumption through an energy efficiency or demand-
18 side management program.

19 **Q. PLEASE DESCRIBE THE COMPANIES' APPROACH IN ANALYZING**
20 **COST OF SERVICE IMPLICATIONS ON NON-NEM CUSTOMERS**
21 **WITHIN THE SAME CLASS AS NEM CUSTOMERS.**

22 A. The study conducted by Witness Harris also calculated the impacts of NEM
23 customers on non-NEM customers by comparing the bill reduction from solar to

1 the cost to serve reduction from solar. Where bill savings exceed the cost of service
2 reduction, NEM customers are benefitting at the expense of non-NEM customers,
3 and where the cost of service reductions exceed bill savings, non-NEM customers
4 are benefitting from the installation of solar. The addition of solar did not reduce
5 any customer non-energy costs because these costs, such as metering, service drop,
6 and minimum distribution system, exist regardless of solar installation. However,
7 the study found that adding solar moderately reduced energy costs for the
8 Companies, slightly reduced distribution capacity costs, and significantly reduced
9 the transmission and production capacity costs. The study further found that a
10 cross-subsidy exists under Existing NEM Programs because NEM customers
11 typically have a materially lower energy usage when you include the production
12 from the solar, but only a slightly reduced demand on the distribution system. This
13 means that the typical bill reduction was larger than the reduction in the cost to
14 serve those customers.

15 **Q. CAN THE LESSONS LEARNED FROM THIS ANALYSIS BE USED**
16 **WHEN IMPLEMENTING THE NEXT GENERATION OF NEM UNDER**
17 **ACT 62?**

18 A. Yes, they can. It is important to note that although the Companies conducted the
19 cost of service analysis as required for Existing NEM Programs, unwarranted cost-
20 shift and subsidization can be addressed in the future via rate design. This means
21 that the Commission and the Companies can leverage these results when looking
22 ahead to implement the next generation of NEM under Act 62 in the Solar Choice
23 tariffs to be filed in separate dockets. In fact, Act 62 specifically requires that the

1 Companies' proposed Solar Choice tariffs mitigate unwarranted cost-shift and
2 subsidization "to the greatest extent practicable." The potential for unwarranted
3 cost-shift or subsidies can be nearly eliminated by designing NEM rates that
4 accurately collect the cost to serve NEM customers. However, such a rate design
5 is sure to be intricate and complex and should be subsequently considered in the
6 Solar Choice tariff dockets established by the Commission.

7 **Q. GIVEN THAT THE COMMISSION MUST ALSO CONSIDER THE ACT**
8 **236 VOS IN ITS ACT 62 COST-BENEFIT ANALYSIS, CAN YOU PLEASE**
9 **PROVIDE A DESCRIPTION OF THE ELEMENTS OF THE ACT 236 VOS?**

10 A. Yes. **Brown Direct Exhibit 2** provides a description of each of the elements of the
11 Act 236 VOS, which were set forth in the settlement agreement (the "Act 236
12 Settlement") approved in Commission Order No. 2015-194 under which the
13 Existing NEM Programs arose. The Act 236 VOS is utilized by the Companies
14 today in the Existing NEM Programs.

15 **Q. WHAT DOES THE ACT 236 VOS REPRESENT?**

16 A. The Act 236 VOS represents the estimated power system benefits from the
17 production of the solar energy at the customer's premises. Most of these benefits
18 are avoided fuel and purchased power costs, but the Act 236 VOS calculation
19 includes all quantifiable benefits noted in **Brown Direct Exhibit 2**.

20 **Q. HOW IS THE ACT 236 VOS USED IN THE EXISTING NEM PROGRAMS?**

21 A. The parties to the Act 236 Settlement agreed to an approach under which the Act
22 236 VOS was used to determine the under-collection or over-collection (as the case
23 may be) of revenue by the Companies by providing full retail rate credit for all

1 energy produced by NEM customers. This was calculated by comparing the
2 estimated annual reduction in a representative customer's bill after the adoption of
3 solar (the unrecovered costs) to the Act 236 VOS per kilowatt hours ("kWh"),
4 multiplied by the solar produced at the customer's premises (the system benefits).
5 If the result is a positive number, that represents an under-collection of revenue
6 after giving the NEM customer credit for the system benefits of the solar. If the
7 result is a negative number, it represents an over-collection of revenue from the
8 NEM customer. The under-collected amounts are collected by the Companies as
9 an incentive under the Act 236 Distributed Energy Resource Program.

10 **Q. WHAT CHANGES TO THE ACT 236 VOS DO THE COMPANIES**
11 **PROPOSE?**

12 A. The Companies are not proposing any changes to the Act 236 VOS in this docket
13 given that the Companies believe it has worked well for its intended purpose and is
14 appropriate to continue under the Act 236 NEM Programs.

15 **Q. DID THE COMPANIES ADDRESS THE DIRECT AND INDIRECT**
16 **ECONOMIC IMPACTS THAT THE COMMISSION IS REQUIRED TO**
17 **CONSIDER PURSUANT TO ACT 62?**

18 A. Yes. Witness Wright has provided information about what he believes, as an
19 economist, should be considered and addressed in evaluating economic studies and
20 impacts. Witness Wright discusses challenges in quantifying such net benefits and
21 describes how Commissions traditionally consider economic impacts in a
22 qualitative, not quantitative, sense. Although the Companies do not maintain the
23 necessary data to perform studies, the Companies will work through questions in

1 discovery in this docket to collect such information and plan to respond to other
2 studies which may be offered or conducted by other parties to this docket.

3 **IV. BEST-PRACTICES AND SOLAR FORECAST**

4 **Q. HAVE THE COMPANIES ANALYZED BEST-PRACTICES FROM**
5 **OTHER JURISDICTIONS?**

6 A. Yes, the Companies have analyzed best-practices from other jurisdictions in
7 accordance with the Commission Directive issued in this docket on August 26,
8 2020. Witness Huber addresses these in his testimony and explains that
9 determining which of the practices would be a “best-practice” in South Carolina
10 depends upon the service territory, the actual tariff design, and the overall goals of
11 the program. While it is critical to examine the actual tariff design, it is fair to point
12 out at this early stage that time of use rates accomplish a key goal of Act 62 by
13 more closely aligning utility costs with the cost to serve and sending better price
14 signals to customers than traditional two-part rates. When coupled with rate
15 mechanisms like a minimum bill or a demand charge, rate structures can be
16 implemented to recover fixed costs—while still sending more accurate price signals
17 for both exports and self-consumption.

18 **Q. HAVE THE COMPANIES CREATED A FORECAST FOR SOLAR**
19 **ADOPTION IN THEIR RESPECTIVE SOUTH CAROLINA SERVICE**
20 **TERRITORIES?**

21 A. Yes. However, the future rate of adoption depends upon a number of factors
22 including but not limited to:

- 23
 - Upfront cost of installation of solar generation.

- 1 • Financing costs (if applicable).
- 2 • Availability of Federal and State tax incentives for solar generation
- 3 investment.
- 4 • Estimated monthly utility bill reduction experienced by the customer,
- 5 which, in turn, results from:
 - 6 ○ Solar production in kilowatt hours per kilowatt of capacity; and
 - 7 ○ The rate credited to the customer for the solar production by the
 - 8 utility.
- 9 • The customer's desire to support renewable energy.

10 The only factor that is subject to the jurisdiction of the Commission is the rate
 11 credited to the customer for the solar production. Therefore, the Companies are
 12 presenting forecasts of NEM solar adoption in DEC and DEP under two different
 13 rate scenarios.

14 **Q. PLEASE EXPLAIN THE TWO SCENARIOS PRESENTED IN THE**
 15 **FORECASTS.**

16 A. Because factors such as financing cost and the customer's ability to fully utilize
 17 investment tax credits vary from customer-to-customer, the Companies use a
 18 “simple payback” model to forecast solar adoption in both scenarios. This means
 19 that the Companies estimated the monthly bill savings from a typical solar facility²
 20 to determine the number of years it takes for the bill savings to equal the estimated

² The Companies calculate the simple payback using the production from an 8 kw rooftop solar PV system.

up front cost of the solar installation.³ Below are the solar adoption forecasts in terms of customers and capacity under two different rate scenarios.

Figure 1

Duke Energy Carolinas SC	Number of Customers		Capacity (MW)	
	Full Retail NEM	Avoided Cost	Full Retail NEM	Avoided Cost
2021	8,795	7,999	97	90
2022	9,777	8,239	106	92
2023	10,762	8,479	116	94
2024	11,773	8,719	125	96
2025	12,860	8,959	134	98
2026	13,985	9,199	144	100
2027	15,129	9,439	155	102
2028	16,290	9,679	164	104
2029	17,471	9,919	175	106
2030	18,661	10,159	184	108

Figure 2

Duke Energy Progress SC	Number of Customers		Capacity (MW)	
	Full Retail NEM	Avoided Cost	Full Retail NEM	Avoided Cost
2021	1,824	1,691	23	21
2022	2,056	1,811	25	22
2023	2,289	1,931	28	23
2024	2,535	2,051	31	24
2025	2,812	2,171	34	25
2026	3,101	2,291	37	26
2027	3,401	2,411	40	27
2028	3,708	2,531	43	28
2029	4,021	2,651	47	29
2030	4,334	2,771	50	30

³ The upfront costs of solar installation are calculated after tax credits on a non-discounted basis.

1 The Full Retail NEM scenario in Figures 1 and 2 represents the current full
2 retail rate NEM program for DEC and DEP, respectively. In this scenario,
3 customers are credited at the full retail rate for all of the solar production and excess
4 kWhs are rolled over to the next month. Monthly excess energy credits can be used
5 to offset future consumption and, once a year, any remaining excess credits are paid
6 to the customer at the avoided cost rate. For DEC, the projected installed capacity
7 is approximately 97 MW at the end of 2021 and this number grows to 184 MW by
8 the end of 2030. For DEP, the respective projected capacity is 23 MW at the end
9 of 2021 and this number grows to 50 MW by the end of 2030. The Full Retail
10 NEM scenario has much higher solar adoption projections than the alternative
11 because customers are able to achieve attractive simple paybacks on their
12 investment due to the higher monthly bill savings than under the Avoided Cost
13 scenario.

14 The Avoided Cost scenario assumes customers are paid 3.5 cents per kWh
15 for all the solar produced by their system. This rate was chosen to approximate a
16 potential, future Commission approved 10-year Standard Offer avoided cost rate.⁴
17 Because that rate is significantly lower than the full retail rate and the customer
18 may not ever fully recover the up-front cost of the solar investment, the adoption
19 forecast is dramatically reduced to roughly 1 to 2 MW per year. These Avoided
20 Cost and full NEM rate scenarios provide “bookends” on forecasted rooftop solar
21 generation over the next ten years.

⁴ The currently Commission approved 10-year Standard Offer rate is approximately 3 cents per kWh.

V. CONCLUSION

Q. HAVE THE COMPANIES ENGAGED WITH STAKEHOLDERS ON THESE TOPICS?

A. Yes, as addressed by Witness Ford, the Companies engaged with stakeholders multiple times and solicited feedback and input on these topics. This was an important process and the Companies received valuable input that aided the Companies' analysis, and the Companies look forward to continuing this collaborative effort in establishing the next generation of NEM in South Carolina.

Q. DOES THIS CONCLUDE YOUR PREFILED DIRECT TESTIMONY?

A. Yes, it does.

SC Net Metering Growth History

NEM Capacity (MW ac)

As of 12/31/2014			
	DEC	DEP	Total
Installed	1	0	1.1

As of 6/30/2019			
	DEC	DEP	Total
In Queue	7.8	2	9.8
Installed	76.4	15.9	92.3
Total Capacity	84.2	17.9	102.1

As of 8/31/2020			
	DEC	DEP	Total
In Queue	10.2	2.2	12.4
Installed	85.5	18.8	104.3
Total Capacity	95.7	21	116.7

Number of NEM Customers

Customer Counts			
	DEC	DEP	Total
As of 12/31/2014	163	5	168
As of 6/30/2019	6,735	1,315	8,050
As of 8/31/2020	8,241	1,731	9,972

Methodology Component	Description	Calculation Methodology/Value
+/- Avoided Energy	Increase/reduction in variable costs to the Utility from conventional energy sources, i.e. fuel use and power plant operations associated with the adoption of NEM.	Component is the marginal value of energy derived from production simulation runs per the Utility's most recent Integrated Resource Planning ("IRP") study and/or Public Utility Regulatory Policy Act ("PURPA") Avoided Cost formulation.
+/- Energy Losses/Line Losses	Increase/reduction of electricity losses by the Utility from the points of generation to the points of delivery associated with the adoption of NEM.	Component is the generation, transmission, and distribution loss factors from either the Utility's most recent cost of service study or its approved Tariffs. Average loss factors are more readily available but marginal loss data is more appropriate and should be used when available.
+/- Avoided Capacity	Increase/reduction in the fixed costs to the Utility of building and maintaining new conventional generation resources associated with the adoption of NEM.	Component is the forecast of marginal capacity costs derived from the Utility's most recent IRP and/or PURPA Avoided Cost formulation. These capacity costs should be adjusted for the appropriate energy losses.
+/- Ancillary Services	Increase/reduction of the costs of services for the Utility such as operating reserves, voltage control, and frequency regulation needed for grid stability associated with the adoption of NEM.	Component includes the increase/decrease in the cost of each Utility's providing or procurement of services, whether services are based on variable load requirements and/or based on a fixed/static requirement, i.e. determined by an N-1 contingency. It also includes the cost of future NEM technologies like "smart inverters" if such technologies can provide services like VAR support, etc.
+/- T&D Capacity	Increase/reduction of costs to the Utility associated with expanding, replacing and/or upgrading transmission and/or distribution capacity associated with the adoption of NEM.	Marginal T&D distribution costs will need to be determined to expand, replace, and/or upgrade capacity on each Utility's system. Due to the nature of NEM generation, this analysis will be highly locational as some distribution feeders may or may not be aligned with the NEM generation profile although they may be more aligned with the transmission system profile/peak. These capacity costs should be adjusted for the appropriate energy losses.
+/- Avoided Criteria Pollutants	Increase/reduction of SO _x , NO _x , and PM ₁₀ emission costs to the Utility due to increase/reduction in production from the Utility's marginal generating resources associated with the adoption of NEM generation if not already included in the Avoided Energy component.	The costs of these criteria pollutants are most likely already accounted for in the Avoided Energy Component, but, if not, they should be accounted for separately. The Avoided Energy component must specify if these are included.
+/- Avoided CO ₂ Emissions Cost	Increase/reduction of CO ₂ emissions due to increase/reduction in production from each Utility's marginal generating resources associated with the adoption of NEM generation.	The cost of CO ₂ emissions may be included in the Avoided Energy Component, but if not, they should be accounted for separately. A zero monetary value will be used until state or federal laws or regulations result in an avoidable cost on Utility systems for these emissions.
+/- Fuel Hedge	Increase/reduction in administrative costs to the Utility of locking in future price of fuel associated with the adoption of NEM.	Component includes the increases/decreases in administrative costs of any Utility's current fuel hedging program as a result of NEM adoption and the cost or benefit associated with serving a portion of its

Methodology Component	Description	Calculation Methodology/Value
		load with a resource that has less volatility due to fuel costs than certain fossil fuels. This value does not include commodity gains or losses and may currently be zero.
+/- Utility Integration & Interconnection Costs	Increase/reduction of costs borne by each Utility to interconnect and integrate NEM.	Costs can be determined most easily by detailed studies and/or literature reviews that have examined the costs of integration and interconnection associated with the adoption of NEM. Appropriate levels of photovoltaic penetration increases in South Carolina should be included.
+/- Utility Administration Costs	Increase/reduction of costs borne by each Utility to administer NEM.	Component includes the incremental costs associated with net metering, such as hand billing of net metering customers and other administrative costs.
+/- Environmental Costs	Increase/reduction of environmental compliance and/or system costs to the Utility.	The environmental compliance and/or Utility system costs might be accounted for in the Avoided Energy component, but, if not, should be accounted for separately. The Avoided Energy component must specify if these are included. These environmental compliance and/ or Utility system costs must be quantifiable and not based on estimates.